REMARKS

Overview of the Office Action

The drawings have been objected to for not showing each feature recited in the claims.

Claims 1-2, 4, and 7-8 have been rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,993,083 ("Shirakata") in view of U.S. Patent No. 5,909,466 ("Labat").

Claim 3 has been rejected under 35 U.S.C. §103(a) as being unpatentable over Shirakata in view of Labat, and further in view of U.S. Patent No. 7,027,499 ("Peon").

Claims 5 and 6 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Shirakata in view of Labat, and further in view of U.S. Patent No. 6,813,325 ("Lin").

Claims 9 and 10 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Shirakata in view of Labat, and further in view of "Turbo Equalization: Adaptive Equalization and Channel Decoding Jointly Optimized" ("Laot").

Status of the claims

Claims 1-4 and 6-9 have been amended.

Claims 5 and 10 have been canceled.

Claims 1-4 and 6-9 remain pending.

Objection to the drawings

The Office Actions states that the drawings have been objected to for not showing each feature recited in the claims. Specifically, the Examiner states that the "interference canceling stage" recited in claim 10 is not shown.

Claim 10 has been canceled. Therefore, this objection is now moot.

Rejection of claims 1-2, 4, and 7-8 under 35 U.S.C. §103(a)

The Office Action states that the combination of Shirakata and Labat teaches all of Applicants' recited elements.

Independent claim 1 has been amended to recite a method for synchronizing symbols at an output of a blind equalizer. The recited method includes "on sending, inserting into a succession of sent symbols, one or more known synchronization sequences repeated at regular intervals in said succession of symbols, detecting said one or more known synchronization sequences in a succession of symbols at the output of said blind equalizer, deducing any shifting of the symbols in the succession of symbols at the output of the blind equalizer from the result of said detection, and retiming the symbols at the output of the blind equalizer, as a function of the deduced shift of the symbols, by eliminating symbols from or adding symbols to the succession of symbols at the output of the blind equalizer, between a synchronization sequence for which a shift is deduced and a preceding synchronization sequence". Support for the claim amendment can be found, for example, in original claim 5 and in Figs. 3a-3c of Applicants' specification.

Shirakata, Labat, and Lin, whether taken alone or in combination, fail to teach or suggest this combination of features as recited in Applicants' amended claim 1.

Applicants' recited method performs synchronizations of symbols by modifying the content of the succession of symbols at the output of a blind equalizer.

According to Applicants' recited method, successions of symbols d(n) are sent over a transmission channel (see Fig. 1 of Applicants' specification). At the output of this transmission channel, the resulting symbols r(n) are received and processed in a receiver that includes a blind equalizer 1 which receives at its input the symbols r(n), which are filtered beforehand, where applicable, and processor means 2 which processes the data y(n) at the output of the equalizer 1

to limit the effect thereon of the loss of timing phenomenon (see paragraph [0033] and Fig. 2 of Applicants' specification). The processing effected by the processor means 2 includes detecting, in the frames of symbols at the output of the blind equalizer 1, known synchronization sequences SYNCH previously inserted into the frames of symbols d(n) at regular intervals, deducing any shift in the symbols processed by the equalizer 1, such as by <u>detecting a shift in the known synchronization sequences</u>, and retiming the data at the output of the equalizer as a function of the deduced shift by eliminating symbols from or adding symbols to the succession of symbols at the output of the blind equalizer between a synchronization sequence for which a shift is detected and a preceding synchronization sequence (see paragraphs [0034]-[0046] and Figs. 3a-3c of Applicants' specification).

The Examiner concedes that Shirakata and Labat, whether taken alone or in combination fail to teach or suggest, "retiming the symbols at the output of the blind equalizer as a function of the deduced shift <u>by eliminating symbols from or adding symbols to the succession of symbols at the output of the blind equalizer between a synchronization sequence for which a shift is detected and a preceding synchronization sequence</u>", as recited in Applicants' amended independent claim 1, which incorporates the subject matter of Applicants' now canceled claim 5.

The Examiner cites col. 3, lines 45-65; col. 7, lines 9-48; and col. 9, lines 5-32 of Lin as teaching the subject matter recited in Applicants' now canceled claim 5. Applicants respectfully disagree.

Lin is directed to a system and method for reducing transmit carrier wander in a DSL communication system. According to Lin, a network timing reference unit provides an automatic embedded solution for synchronizing DSL frames to <u>an external communication system reference clock</u>. The network timing reference unit of Lin applies or removes bits to

adjust the length of a DSL frame in response to a sliding window state table. A sliding window is selected in response to the relative position of the DSL frame to a system clock reference point over a number of DSL frames. Further, according to Lin, the method can be described as: receiving a network clock and a DSL data stream comprising a plurality of frames; identifying a reference point on the network clock signal; identifying a DSL frame reference point; recording the relative position of the DSL frame reference point to the network clock reference point; performing a bit-manipulation responsive to the relative reference positions and a current window position; and adjusting the current window position in response to a consistent relative reference position between the network clock and DSL frame reference points (see Abstract of Lin).

The cited passages of Lin simply disclose that a DSP 220 within the HTU-R 244 includes a network timing reference unit 300 and at least one sliding window state table 222, 224. The network timing reference unit 300 of Lin receives an external timing reference signal 275 as well as a series of HDSL frames. The network timing reference unit 300 of Lin is configured to apply the delete and stuffing bits D1, D2, S1, and S2 in at least one of the sliding window state tables 222, 224, respectively.

According to Lin, the sliding window register input 365 is coupled to the sliding window register 360 to select an initial sliding window (i.e., window 1, 2, 3, or 4) for the NTRU 300. Similarly, the sensitivity buffer input 399 of Lin is coupled to the sensitivity buffer 390 in order to store a sensitivity threshold, M. The timing reference signal 275 of Lin is coupled to an input of the counter 310, which is configured to trigger a reference clock latch input signal 315 upon receipt of the X^{th} clock transition. Having received an indication that the X^{th} clock transition has occurred, the reference clock latch 320 of Lin is configured to indicate the same via a first lead/lag comparator

input 325. The HDSL data input 240 of Lin is coupled to an input of a synchronization word detector 340. The synchronization word detector 340 of Lin is configured to trigger a DSL frame latch input 345 upon receiving a synchronization word within the DSL data stream. Having received an indication that the DSL frame synchronization word for the next DSL frame has been processed, the DSL frame latch 350 of Lin is configured to indicate the same via a second lead/lag comparator input 355. In turn, the lead/lag comparator 330 of Lin receives the first and second lead/lag comparator inputs 325, 355, respectively, and is configured to provide an output signal 335 that indicates whether the DSL frame synchronization word is leading or lagging the timing reference signal 275 (see Fig. 4 and col. 7, line 49 to col. 8, line 14 of Lin).

Further, the sliding window state table 222, 224 of Lin receives a sliding window register input signal 375 indicative of the current sliding window (1 through 4) that is to be applied for selecting the stuff/delete bits. The sliding window state table 222, 224 of Lin is configured to receive the lead/lag comparator output signal 335. Together, the lead/lag comparator output signal 335 and the sliding window register input signal of Lin identify the appropriate stuff/delete bits to be applied to the DSL frame to correct the relative timing of the DSL frame to the timing reference signal 275 (see Fig. 4 and col. 8, lines 15-25 of Lin).

Thus, Lin clearly teaches that the DSL frame is retimed by comparing the DSL frame to a an external reference clock, determining the offset of DSL frame from the reference clock, and adding or deleting bits to adjust the DSL frame to be synchronous with the external reference clock.

In contrast to Lin, and as discussed above, Applicants' recited synchronization method includes "retiming the symbols at the output of the blind equalizer, as a function of the deduced shift, by eliminating symbols from or adding symbols to the succession of symbols at the output

of the blind equalizer, between a synchronization sequence for which a shift is deduced and a preceding synchronization sequence", as recited in Applicants' amended claim 1. Applicants' recited synchronization method does not require an external clock signal, such as the external clock signal that is required by Lin.

Furthermore, Lin does not at all address the technical problem of timing loss at the output of a blind equalizer. Consequently, a person with ordinary skills in the art would not be motivated to look to Lin to for a blind equalizer output synchronization solution to apply to a device produced by combining the teachings of Shirakata and Labat.

In view of the foregoing, Applicants submit that Shirakata, Labat, and Lin, whether taken alone or in combination, fail to teach or suggest the synchronization method recited in amended claim 1. Accordingly, amended claim 1 is patentable over Shirakata, Labat, and Lin under 35 U.S.C. §103(a).

Independent claim 8 has been amended to recite limitations similar to independent claim 1 and is, therefore, patentable over Shirakata, Labat, and Lin for reasons discussed above with respect to independent claim 1.

Dependent claims

Claim 2, 4, and 7, which depend from independent claim 1, incorporate all of the limitations of independent claim 1 and are, therefore, deemed to be patentably distinct over Shirakata, Labat, and Lin for at least those reasons discussed above with respect to independent claim 1.

Rejection of claim 3 under 35 U.S.C. §103(a)

The Office Action states that the combination of Shirakata, Labat, and Peon teaches all of Applicants' recited elements.

As previously discussed, Shirakata and Labat do not teach or suggest the subject matter recited in Applicants' amended independent claim 1.

Because Shirakata and Labat do not teach or suggest the subject matter recited in amended independent claim 1, and because Peon does not teach or suggest the elements of claim 1 that Shirakata and Labat are missing, the addition of Peon does not remedy the above-described deficiencies of Shirakata and Labat.

Claims 3, which depends from independent claim 1, incorporates all of the limitations of independent claim 1 and is, therefore, deemed to be patentably distinct over Shirakata, Labat, and Peon for at least those reasons discussed above with respect to independent claim 1.

Rejection of claim 6 under 35 U.S.C. §103(a)

The Office Action states that the combination of Shirakata, Labat, and Lin teaches all of Applicants' recited elements.

As previously discussed, Shirakata, Labat, and Lin do not teach or suggest the subject matter recited in Applicants' amended independent claim 1.

Claim 5 has been canceled. Claim 6, which now depends from independent claim 1, incorporates all of the limitations of independent claim 1 and is, therefore, deemed to be patentably distinct over Shirakata, Labat, and Lin for at least those reasons discussed above with respect to independent claim 1.

Rejection of claims 9 and 10 under 35 U.S.C. §103(a)

The Office Action states that the combination of Shirakata, Labat, and Laot teaches all of Applicants' recited elements.

As previously discussed, Shirakata and Labat do not teach or suggest the subject matter recited in Applicants' amended independent claim 8.

Because Shirakata and Labat do not teach or suggest the subject matter recited in amended independent claim 8, and because Laot does not teach or suggest the elements of claim 8 that Shirakata and Labat are missing, the addition of Laot does not remedy the above-described deficiencies of Shirakata and Labat.

Claim 10 has been canceled. Claim 9, which depends from independent claim 8, incorporates all of the limitations of independent claim 8 and is, therefore, deemed to be patentably distinct over Shirakata, Labat, and Laot for at least those reasons discussed above with respect to independent claim 8.

Conclusion

In view of the foregoing, reconsideration and withdrawal of all rejections, and allowance of all pending claims, are respectfully solicited.

Should the Examiner have any comments, questions, suggestions, or objections, the Examiner is respectfully requested to telephone the undersigned

Respectfully submitted,

COHEN PONTANI LIEBERMAN & PAVANE LLP

By ____________________________________

Thomas Langer
Reg. No. 27,264
551 Fifth Avenue, Suite 1210
New York, New York 10176
(212) 687-2770

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Should the Examiner have any comments, questions, suggestions, or objections, the Examiner is respectfully requested to telephone the undersigned

Respectfully submitted,

COHEN PONTANI LIEBERMAN & PAVANE LLP

By Thomas Langer

Thomas Langer
Reg. No. 27,264
551 Fifth Avenue, Suite 1210
New York, New York 10176
(212) 687-2770

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